CLAIMS

We claim:

1. An isolated coronavirus genome comprising the nucleic acid as set forth in SEQ ID NO: 1.

2. An isolated coronavirus protein comprising the amino acid sequence as set forth in:

SEQ ID NO: 2 (polyprotein 1a);
SEQ ID NO: 3 (polyprotein 1b);
SEQ ID NO: 4 (S protein);
SEQ ID NO: 5 (X1 protein);
SEQ ID NO: 6 (X2 protein);
SEQ ID NO: 7 (E protein);
SEQ ID NO: 8 (M protein);
SEQ ID NO: 9 (X3 protein);
SEQ ID NO: 10 (X4 protein);
SEQ ID NO: 11 (X5 protein); or
SEQ ID NO: 12 (N protein).

3. An isolated nucleic acid molecule encoding any one of the proteins according to claim 2.

4. The isolated nucleic acid molecule of claim 3, comprising a nucleotide sequence as set forth in:

nucleotides 265 to 13,398 of SEQ ID NO: 1 (polyprotein 1a);
nucleotides 13,398 to 21,482 of SEQ ID NO: 1 (polyprotein 1b);
nucleotides 21,492 to 25,256 of SEQ ID NO: 1 (S protein);
nucleotides 25,268 to 26,089 of SEQ ID NO: 1 (X1 protein);

nucleotides 25,689 to 26,150 of SEQ ID NO: 1 (X2 protein);
nucleotides 26,117 to 26,344 of SEQ ID NO: 1 (E protein);
nucleotides 26,398 to 27,060 of SEQ ID NO: 1 (M protein);
nucleotides 27,074 to 27,262 of SEQ ID NO: 1 (X3 protein);
nucleotides 27,273 to 27,638 of SEQ ID NO: 1 (X4 protein);
nucleotides 27,864 to 28,115 of SEQ ID NO: 1 (X5 protein); or
nucleotides 28,120 to 29,385 of SEQ ID NO: 1 (N protein).

5. A method of detecting a severe acute respiratory syndrome-associated coronavirus (SARS-CoV) in a sample, comprising:

contacting the sample with a pair of nucleic acid primers that hybridize to a SARS-CoV nucleic acid, wherein at least one primer is 5'-end labeled with a reporter dye;

amplifying the SARS-CoV nucleic acid or a fragment thereof from the sample utilizing the pair of nucleic acid primers;

electrophoresing the amplified products; and

detecting the 5'-end labeled reporter dye, thereby detecting a SARS-CoV.

6. The method of claim 5, wherein the amplification utilizes reverse transcriptase-polymerase chain reaction.

7. The method of claim 5, wherein at least one of the nucleic acid primers that hybridize to a SARS-CoV nucleic acid comprises a sequence as set forth in any one of SEQ ID NOs: 13-15.

8. A method of detecting a severe acute respiratory syndrome-associated coronavirus (SARS-CoV) in a sample, comprising:

contacting the sample with a pair of nucleic acid primers that hybridize to a SARS-CoV nucleic acid;

amplifying the SARS-CoV nucleic acid or a fragment thereof from the sample utilizing the pair of nucleic acid primers;

adding to the amplified SARS-CoV nucleic acid or the fragment thereof a TaqMan SARS-CoV probe that hybridizes to the SARS-CoV nucleic acid, wherein the TaqMan SARS-CoV probe is labeled with a 5'-reporter dye and a 3'-quencher dye;

performing one or more additional rounds of amplification; and

detecting fluorescence of the 5'-reporter dye, thereby detecting a SARS-CoV.

9. The method of claim 8, wherein the amplification utilizes reverse transcriptase-polymerase chain reaction.

10. The method of claim 8, wherein at least one of the nucleic acid primers that hybridize to a SARS-CoV nucleic acid and/or the TaqMan SARS-CoV probe that hybridizes to the SARS-CoV nucleic acid comprises a sequence as set forth in any one of SEQ ID NOs: 16-33.

11. A method of detecting a severe acute respiratory syndrome-associated coronavirus (SARS-CoV) in a biological sample comprising antibodies, comprising:

contacting the biological sample with a SARS-CoV-specific antigen, wherein the antigen comprises a SARS-CoV organism; and

determining whether a binding reaction occurs between the SARS-CoV-specific antigen and an antibody in the biological sample if such is present, thereby detecting SARS-CoV.

12. A method of detecting a severe acute respiratory syndrome-associated coronavirus (SARS-CoV) in a biological sample comprising polypeptides and/or fragments thereof, comprising:

contacting the biological sample with a SARS-CoV-specific antibody; and

determining whether a binding reaction occurs between the SARS-CoV-specific antibody and a SARS-CoV polypeptide or fragment thereof in the biological sample if such is present, thereby detecting SARS-CoV.

13. The method of claim 12, wherein determining whether a binding reaction occurs between the SARS-CoV-specific antibody and a SARS-CoV polypeptide or fragment thereof is carried out *in situ* or in a tissue sample.

14. The method of claim 12, wherein determining whether a binding reaction occurs between the SARS-CoV-specific antibody and a SARS-CoV polypeptide or fragment thereof comprises an immunohistochemical assay.

15. A kit for detecting a severe acute respiratory syndrome-associated coronavirus (SARS-CoV) in a sample, comprising:

a pair of nucleic acid primers that hybridize under stringent conditions to a SARS-CoV nucleic acid, wherein one primer is 5'-end labeled with a reporter dye.

16. The kit of claim 15, wherein at least one of the nucleic acid primers that hybridize to a SARS-CoV nucleic acid comprises a sequence as set forth in any one of SEQ ID NOs: 13-15.

17. A kit for detecting a severe acute respiratory syndrome-associated coronavirus (SARS-CoV) in a sample, comprising:

a pair of nucleic acid primers that hybridize under high stringency conditions to a SARS-CoV nucleic acid; and

a TaqMan SARS-CoV probe that hybridizes to the SARS-CoV nucleic acid, wherein the TaqMan SARS-CoV probe is labeled with a 5'-reporter dye and a 3'-quencher dye.

18. The kit of claim 17, wherein at least one of the nucleic acid primers that hybridize to a SARS-CoV nucleic acid and/or the TaqMan SARS-CoV probe that hybridizes to the SARS-CoV nucleic acid comprises a sequence as set forth in any one of SEQ ID NOs: 16-33.

19. A kit for detecting a severe acute respiratory syndrome-associated coronavirus (SARS-CoV) in a biological sample, comprising:

an isolated SARS-CoV organism.

20. A composition comprising an isolated severe acute respiratory syndrome-associated coronavirus (SARS-CoV) organism.

21. The composition of claim 20, wherein the isolated SARS-CoV organism is an inactive isolated SARS-CoV organism.

22. The composition of claim 21, further comprising at least one component selected from the group consisting of pharmaceutically acceptable carriers, adjuvants and combinations of two or more thereof.

23. A method of eliciting an immune response against an antigenic epitope in a subject, comprising introducing into the subject the composition of claim 22, thereby eliciting an immune response in the subject.